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United States Patent [19]
Rebriere

[11] **Patent Number:** **6,160,264**
[45] **Date of Patent:** **Dec. 12, 2000**

[54] **SYSTEM FOR PLOTTING A TRI-DIMENSIONAL SHAPE, NOTABLY A PLANTAR ARCH, AND METHOD OF OPERATING THE SYSTEM FOR PRODUCING AN ORTHOPAEDIC SHOE OR SOLE**

FOREIGN PATENT DOCUMENTS

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[21] **Appl. No.:** **09/295,331**

[57] ABSTRACT

[22] **Filed:** **Apr. 21, 1999**

The system (7) for plotting the shape of a tri-dimensional object (2) is used in particular for the profile of a plantar arch (20). It comprises a sensing device (1) having rods (3) movable in a support (10, 11) such that said object (2) can be applied onto the first end (300) of each of said rods under a determined pressure force so as to drive said rods (3) in a translation motion and such that the set of the second ends (301) of said rods (3) define a surface (S_A) replicating said shape to be plotted (20). Spring means (4) are associated with said movable rods (3) to oppose a calibrated resilient force opposing said pressure force. The system further comprises a contactless acquisition device (5) for acquiring and digitalizing said surface (S_A) replicating said shape to be plotted (20), said device (5) delivering output electric signals (V_s) correlated with the space coordinates of said second end (301) of said rods (3), with respect to reference coordinates (P_R) defined by the position taken by the rods in a so-called rest state.

[30] Foreign Application Priority Data

Apr. 21, 1998 [FR] France 98-04981

[51] **Int. Cl.⁷** **G01B 11/24**

[52] **U.S. Cl.** **250/559.22; 33/33 A; 33/33 C; 33/552; 12/142 N; 12/146 M; 12/1 R**

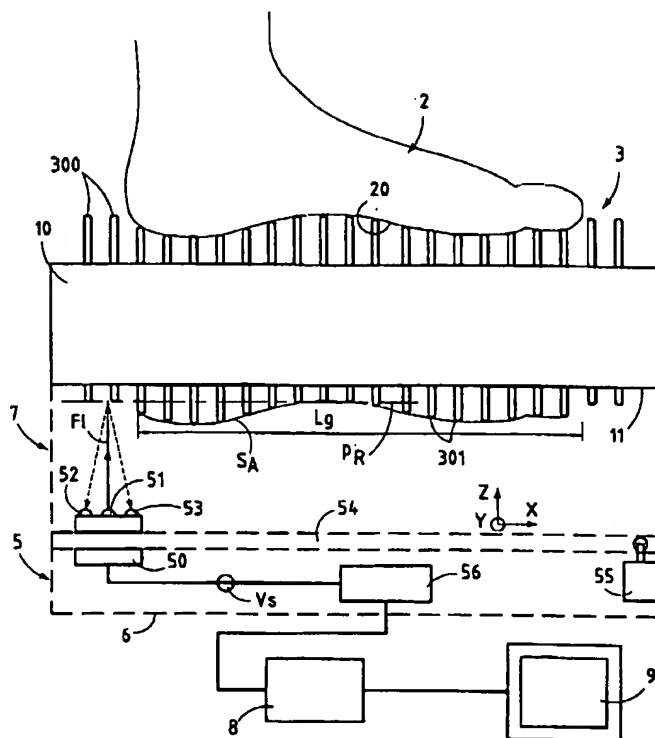
[58] **Field of Search** **250/559.22, 559.33; 33/3 A, 3 B, 3 C, 514.2, 512, 552; 12/142 N, 146 M, 1 R**

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21 Claims, 5 Drawing Sheets



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DOCUMENT-IDENTIFIER: US 6160264 A

TITLE: System for plotting a tri-dimensional shape, notably a plantar arch, and method of operating the system for producing an orthopaedic shoe or sole

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TITLE - TI (1):

System for plotting a tri-dimensional shape, notably a plantar arch, and method of operating the system for producing an orthopaedic shoe or sole

Detailed Description Text - DETX (50):

Finally, in the preferred application of the invention, the acquisition data available under a digital shape can be used during a final phase, in a direct or delayed manner, for digitally controlling a machine tool producing orthopaedic shoe components, in particular the integrated sole of such shoes, or an orthopaedic sole to be inserted into a conventional shoe. This phase can be implemented either in situ or remotely. In such a case, the data can be transmitted by computerized communications (local area network, internet, etc.) or can be recorded on an intermediary medium (disc, magnetic band, and so on).

Detailed Description Text - DETX (53):

In the example illustrated in FIG. 5, the plotting system 7 properly said is independent from the signal processing assembly consisting of a microcomputer 8, which allows transporting it easily. The link with the microcomputer 8 consists of a simple cable Ca, for instance its first end with the connector 57 of the housing 6 and at a second end with a connector 80 of the microcomputer 8. The microcomputer 8 is coupled to a viewing member, or monitor, 9 and to a data and/or instructions entry keyboard 82. It includes the conventional circuits for this type of equipment: random access memory, central unit, mass memory (hard disk), compact disk drive, and so on, non-represented in the figure. It also includes a reader/recorder 81 for discs DK, on which all or part of the acquired and digitized data can be recorded. The programs, whether or not specific, necessary for the proper operation of the microcomputer 8 are

loaded by means of diskettes, a compact disk or direct downloading from a local area network or an external network (internet, intranet, and so on). The digitalization can be performed, either directly by means of the circuits included in the chassis 7 (FIG. 4: 56) or by a specialized board of the microcomputer 8, which receives the data under an analog form through the cable
Ca.